

Introduction to Applied Geophysics

Earth Sciences 207

Section: D100

Term: 2010 Fall

Instructor: Dr. Andy Calvert

(Email: acalvert@sfu.ca; Phone: 778-782-5511; Office: TASC 1 Room 7415)

Discussion Topics: Course Outline: REQUIREMENT DESIGNATION: Q

Use of physical measurements in determining the subsurface properties of the Earth. Principles underlying analysis of geophysical data. Basic rock physics. Gravity surveying: basic theory, instrumentation, data reduction, and anomaly interpretation. Magnetic surveying: rock magnetism, Earth's magnetic field, instrumentation, data reduction, anomaly interpretation. Electrical surveying: (i) resistivity of rocks, electrode arrays and current flow in the ground, resistivity sounding and profiling; (ii) induced polarisation, IP measurement and applications; (iii) self potential methods. Seismic surveying: stress and strain, seismic waves, reflection and refraction of seismic waves, critical refraction, rays and waves. Seismic refraction surveying: seismic sources and detectors, geometry of refracted raypaths for horizontal, dipping and undulating layers, data interpretation.

Course Topics:

Introduction to geophysical data: physical properties of rocks , sampling, time vs. frequency

Gravity surveying

Magnetic surveying

Electrical methods: resistivity, induced polarisation and self potential

Seismic refraction methods

Grading: 1. Midterm examination 15%

2. Laboratory/Assignments 35%

3. Final examination 50%

Required Texts: An Introduction to Applied and Environmental Geophysics, by J.M. Reynolds (Wiley) ISBN 0-471-95555-8.

Introduction to Applied Geophysics

Recommended Texts: None.

Materials/Supplies: None.

Prerequisite/Corequisite: EASC 101, MATH 152, PHYS 121, PHYS 131, All with grade C- or higher, or EASC 101, MATH 152 with a grade of C- or higher and PHYS 102, PHYS 130 both with a grade of B or higher. FAN X99

No student will be admitted to this course unless all physics prerequisites have been completed, i.e. PHYS 120, PHYS 121, PHYS 131 or acceptable substitute.

Notes: None.

This outline is derived from a course outline repository database that was maintained by SFU Student Services and the University's IT Services Department. The database was retired in 2014 and the data migrated to SFU Archives in 2015.